

The distances apart of the species groups in this model can be calculated (Table 6); they represent their degree of distributional dissimilarity. *Lasius alienus* and *Tetramorium caespitum* are close together (less than half the distance between *T. caespitum* and *Formica fusca* the next nearest), but the rest for various reasons are well spaced out. It is perhaps not over-simplifying to say that *Lasius niger* is separated from the others by component 1 (water), 'no-ants' by component 2 (nutrient supply) and *Formica fusca* by component 3 (wind exposure). The remaining two, *Lasius alienus* and *Tetramorium caespitum*, co-exist in most areas of dry heath though as already mentioned there is a tendency for the former to be relatively more common in higher, drier, more mineral soils with sparser vegetation comprising fewer grasses.

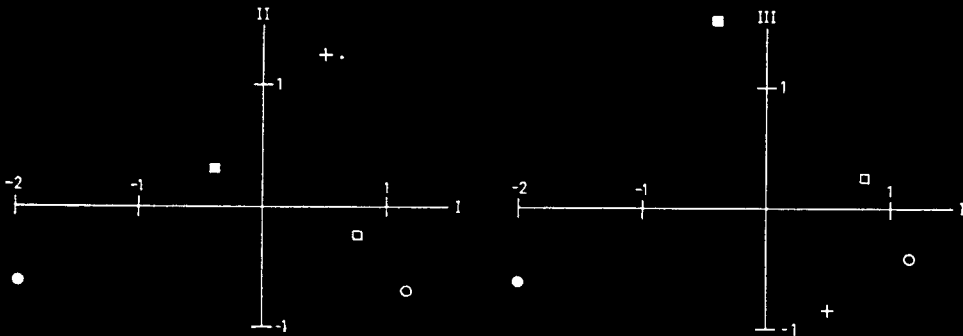


FIG. 2. Species positions in the component space; deviations from mean at origin.
○, *Lasius alienus*; ●, *L. niger*; ■, *Formica fusca*; □, *Tetramorium caespitum*; +, no-ants.

DISCUSSION

Since the species of ant are not randomly distributed but have acquired some relation to the pattern of habitat variation it must be presumed that mechanisms of assortment exist. There are of course two obvious ones: first, that the queens have some power to select the best habitat in which to live, and although quite clearly there must be a strong bias in favour of those able to do this, the difficulties of developing a guidance system that responds appropriately must be considerable. Second, the colonies once established may further assort themselves through population pressure largely dependent on the success with which they exploit their immediate resources and their potentiality for aggression. It is hoped to throw light on these processes in later papers.

Ecological distribution

Differences in the habitats occupied by *Lasius niger* and *L. alienus* are frequently reported and it is generally agreed that in north and central Europe *L. alienus* is restricted to dry open places whereas *L. niger* ranges widely (Gösswald 1932, 1951; Šilhavý 1938; Wilson 1955; Collingwood 1957). Elsewhere, however, this does not seem to be the case; in the Mediterranean area both may be found though not necessarily together, in gardens, scrub and woodland and *L. alienus* forages epigaeically (Bernard 1956; Collingwood 1956), similarly in Hokkaido, Japan (Hayashida 1960). In North America, *L. alienus* is usually found in woodland except at high altitudes when it may appear in the open (Wilson 1955) and Wilson's suggestion that this is due to competitive exclusion by *L. niger* in Europe and by *L. neoniger* in America both of which are conspicuously eurytopic, is interesting.

niger/alienus